

1732

PATENT  
2185-0475P

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant: TANIMURA et al. Conf.: UNASSIGNED  
Appl. No.: 09/689,592 Group: UNASSIGNED  
Filed: October 13, 2000 Examiner: UNASSIGNED

#JFW  
1501

PROCESS FOR PRODUCING POLYOLEFIN-BASED  
RESIN COMPOSITION

LETTER SUBMITTING VERIFIED ENGLISH  
TRANSLATION OF PRIORITY DOCUMENT

RECEIVED  
JAN 14 2002  
TC 1700



Assistant Commissioner for Patents  
Washington, DC 20231

January 9, 2002

Sir:

Applicants submit that they have perfected their priority right to JP Heisei 11-293994, having a filing date of October 15, 1999, upon which priority has been claimed under 35 USC § 119, by the filing of (i) a certified copy of the priority document on October 13, 2000, and (ii) the accompanying verified English language translation of JP Heisei 11-293994.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact John W. Bailey (Reg. No. 32,881) at the telephone number below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any

Appl. No. 09/689,592

additional fees required under 37 C.F.R. § 1.16 or under § 1.17;  
particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By 

John W. Bailey, #32,881

P.O. Box 747

Falls Church, VA 22040-0747

(703) 205-8000

JWB/end  
2185-0475P



# DECLARATION

I, Hideki OMOTE, a national of Japan, c/o Sumitomo Chemical Intellectual Property Service, Limited, 5-33 Kitahama 4-chome Chuo-ku Osaka-shi, Osaka 541-8550, Japan, declare that to the best of my knowledge and belief the attached is a full, true and faithful translation into English made by me of the certified copy of Japanese Patent Application No. Heisei 11-293994 attached thereto.

Signed this 26th day of December, 2001

  
Hideki OMOTE

RECEIVED  
JAN 14 2002  
TC 1700



PATENT OFFICE  
JAPANESE GOVERNMENT

This is to certify that the annexed is a true copy of the following application as filed with this Office.

Date of Application : October 15, 1999  
Application Number : Japanese Patent Application  
No.Heisei 11-293994  
Applicant(s) : SUMITOMO CHEMICAL COMPANY, LIMITED

RECEIVED  
JAN 14 2002  
TC 1700

July 28, 2000

Commissioner,

Patent Office Kozo OIKAWA(SEAL)

(Certificate No.2000-3060133)

Patent Application No.Heisei 11-293994

[Name of Document] Patent Application

[Reference Number] P150791

[Date of Submission] October 15, 1999

[Addressee] Commissioner,  
Patent Office

[International Patent Classification] C08J 5/18  
C08L 23/10

[Inventor]

[Address] c/o SUMITOMO CHEMICAL COMPANY, LIMITED,  
5-1, Anegasakikaigan, Ichihara-shi, Chiba, Japan

[Name] Hiroyuki TANIMURA

[Inventor]

[Address] c/o SUMITOMO CHEMICAL COMPANY, LIMITED,  
5-1, Anegasakikaigan, Ichihara-shi, Chiba, Japan

[Name] Ken EBARA

[Applicant]

[Applicant's ID Number] 000002093

[Name] SUMITOMO CHEMICAL COMPANY, LIMITED

[Agent]

[Agent's ID Number] 100093285

[Patent Attorney]

[Name] Takashi KUBOYAMA

[Telephone] 06-6220-3404

[Elected Agent]

[Agent's ID Number] 100094477

[Patent Attorney]

[Name] Naoyoshi JINNO

[Telephone] 06-6220-3404

[Elected Agent]

[Agent's ID Number] 100113000

[Patent Attorney]

[Name] Toru NAKAYAMA

TC 1700

[Telephone]

06-6220-3404

[Indication on Fee]

[Prepayment Register Number] 010238

[Amount of Payment] ¥21,000-

[List of Articles Filed]

[Name of Article] Specification . . . . 1

[Name of Article] Abstract . . . . . 1

[Number of General Power] 9903380

[Necessity of Proof] Necessary

Patent Application No.Heisei 11-293994

[Name of Document] Correction Data

[Document Corrected] Patent Application

[Acknowledged Data · Additional Data]

[Applicant]

[Applicant's ID Number] 000002093

[Address] 5-33 Kitahama 4-chome Chuo-ku Osaka-shi, Osaka

[Name] SUMITOMO CHEMICAL COMPANY, LIMITED

[Agent] Requestor

[Agent's ID Number] 100093285

[Address] c/o SUMITOMO CHEMICAL COMPANY, LIMITED,  
5-33 Kitahama 4-chome Chuo-ku Osaka-shi, Osaka

[Name] Takashi KUBOYAMA

[Agent]

[Agent's ID Number] 100094477

[Address] c/o SUMITOMO CHEMICAL COMPANY, LIMITED,  
5-33 Kitahama 4-chome Chuo-ku Osaka-shi, Osaka

[Name] Naoyoshi JINNO

Patent Application No.Heisei 11-293994

Applicant's Past Record

Applicant's ID Number [000002093]

1. Date of Alteration 28 August, 1990

[Reason for Alteration] New Registration

Address 5-33 Kitahama 4-chome Chuo-ku Osaka-shi,  
Osaka

Name SUMITOMO CHEMICAL COMPANY, LIMITED



[Name of Document] SPECIFICATION

[Title of the Invention]

POLYOLEFIN-BASED RESIN COMPOSITION

[Scope of Claim for Patent]

[Claim 1]

A polyolefin-based resin composition comprising 100 parts by weight of a polyolefin-based resin and 0.05 to 2 parts by weight of a polymer fine particle anti-blocking agent containing 0.10 to 90% by weight of a volatile component.

[Claim 2]

A polyolefin-based resin composition according to claim 1, wherein the volatile component contained in the polymer fine particle anti-blocking agent is 0.10 to 80% by weight and its mean particle diameter is 0.5 to 15  $\mu$ m.

[Claim 3]

A polyolefin-based resin film prepared by using the polyolefin-based resin composition according to claim 1 or 2.

[Claim 4]

A polyolefin-based resin film obtained by stretching the polyolefin-based resin composition according to claim 1 or 2 to at least a uniaxial direction.

[Detailed Description of the Invention]

[0001]

[Technical Field of the Invention]

The present invention relates to a polyolefin-based resin composition. More particularly, the present invention relates to a polyolefin-based resin composition which has a good dispersion of a polymer fine particle being an anti-blocking agent to a polyolefin-based resin, and has a good balance in appearances such as transparency, see-through feeling, no generation of white spot (occasionally called as void) and the like, and handling properties such as an anti-blocking property and the like, when a film is made; and a polyolefin-based resin film made of the composition.

[0002]

[Prior Art]

A polyolefin-based resin film made of a propylene-based resin is used for a material for food packaging, a material for textile packaging and the like, because it is superior in physical properties such as transparency, mechanical property and the like. However, the polyolefin-based resin film has an insufficient anti-blocking property, piled films are mutually adhered, and the operability at packaging is lowered.

[0003]

In order to improve the anti-blocking property of the

polyolefin-based resin film, a polyolefin-based resin composition using a polyolefin-based resin and a finely powdery or fine particle inorganic material as an anti-blocking agent is reported. For example, a fine particle having magnesium silicate as a main component is reported in Japanese Patent Publication JP48-014423B, and a polyolefin-based resin composition using a zeolite powder and a film made of the composition are reported in JP52-016134B.

[0004]

However, these polyolefin-based resin compositions have problems that voids are generated by an inorganic material as a nucleus when a film is molded using the composition and the transparency of the film is deteriorates, because the affinity of the polyolefin-based resin with the finely powdery or fine particle inorganic material is insufficient. Further, as the inorganic material is hard, a scratch is generated when the films are mutually rubbed. Namely, it has also a problem that the scratch resistance of a film is bad.

[0005]

In place of these finely powdery or fine particle inorganic materials, a polyolefin-based resin composition using a polymer fine particle as an anti-blocking agent is reported. For example, a polymer

fine powder having a particle diameter of 3 to 40  $\mu\text{m}$  and no melting point in JP57-064522A, an inert organic polymer crosslinking particle having an average particle diameter of 0.5 to 7  $\mu\text{m}$  in JP05-214120A, and a polyolefin-based resin composition using the crosslinked particle of a polymer obtained by copolymerizing an acrylic monomer and a styrene monomer as main components which has an average particle diameter of 0.4 to 7  $\mu\text{m}$  and a film made of the composition in JP06-107868A, are reported. However, these polymer fine particles have problems that voids are generated in a film and the transparency of the film is deteriorates, because the interface affinity of the particle with the polyolefin-based resin is insufficient.

[0006]

In general, the polymer fine particle being an anti-blocking agent has properties of which it hardly disperses in the polyolefin-based resin, and easily coagulates. Therefore, when a film is produced by adding the polymer fine particle to the polyolefin-based resin, there have been problems that the coagulated product is not dispersed, white spots caused by the coagulated product are generated, the appearance of the film is deteriorated, and points not inked are generated at printing to the film, etc.

[0007]

[Problems to be Solved by the Invention]

The subject in the present invention is to provide a polyolefin-based resin composition which has a good dispersion of a polymer fine particle being an anti-blocking agent to a polyolefin-based resin, and has a good balance in appearances such as transparency, fluoroscopic feeling, no generation of a white spot and the like, and handling properties such as an anti-blocking property and the like, when a film is made; and a polyolefin-based resin film comprising the composition.

[0008]

[Means for Solving Problems]

Under these circumstances, the present inventors have intensively studied and as a result, found out that the above-mentioned problems can be solved by using a polyolefin-based resin composition comprising a polyolefin-based resin and a polymer fine particle containing a specific amount of a volatile component being an anti-blocking agent to complete the present invention.

[0009]

Namely, the present invention relates to a polyolefin-based resin composition containing 100 parts by weight of a polyolefin-based resin (component A) and 0,05 to 2 parts by weight of a polymer fine particle anti-blocking agent (component B) containing 0.10 to 90%

by weight of a volatile component.

Further, the present invention relates to a film comprising the above-mentioned polyolefin-based resin composition.

[0010]

[Mode of Operation of The Invention]

The present invention is illustrated in detail below.

The polyolefin-based resin (component A) used in the present invention is a homopolymer or a copolymer of an olefin-based monomer, or a mixture thereof. The olefin-based monomer is ethylene and  $\alpha$ -olefin, and examples of the  $\alpha$ -olefin include propylene, butene-1, hexene-1, 4-methylpentene-1, octene-1 and the like.

[0011]

As the polyolefin-based resin, a propylene-based resin is preferable. The propylene-based resin is a homopolymer or a copolymer of propylene monomer, or a mixture thereof. Examples include a propylene homopolymer, a copolymer of propylene with other olefin, or a mixture thereof. Examples of the copolymer of propylene with other olefin include a propylene-ethylene copolymer, a propylene-butene-1 copolymer, a propylene-ethylene-butene-1 copolymer, and the like.

[0012]

The propylene-based resin is preferably a

propylene-based resin including a crystalline propylene homopolymer and/or a crystalline propylene copolymer.

Crystallinity can be determined by the amount of the cold xylene (20°C xylene)-soluble portion (CXS) of the crystalline propylene homopolymer or the crystalline propylene copolymer. It shows many amorphous portion and low crystallinity that there is many cold xylene-soluble portion (CXS), and it shows little amorphous portion and high crystallinity that there is little cool xylene-soluble portion (CXS). The cold xylene-soluble portion (CXS) is preferably 30% by weight or less, more preferably 20% by weight or less, and preferably 15% by weight or less in particular.

[0013]

The more preferable propylene-based resin is a crystalline propylene homopolymer and a crystalline propylene copolymer in which the content of at least one or more of monomers selected from ethylene, butene-1, hexene-1, 4-methylpentene-1 and octene-1 is 2% by weight or less.

[0014]

The melt flow rate (MFR) of the polyolefin-based resin used in the present invention is preferably 0.1 to 20g/10min. from the view point of processability and film property, and more preferably 0.5 to 10g/10min.

[0015]

Further, in the polyolefin-based resin used in the present invention, polyolefin-based polymers such as a polyethylene, a polybutene-1, a styrene-based resin, an ethylene-propylene copolymer rubber, an ethylene-propylene-diene copolymer rubber and the like, may be added according to requirement, within a range in which the object and effect of the present invention are not damaged.

[0016]

The polymer fine particle anti-blocking agent (component B) used in the present invention is not specifically limited, and an agent obtained by addition polymerizing at least one or more of monomers such as an aromatic mono vinyl compound, an acrylic acid ester compound, a methacrylic acid ester compound, a mono- or di-carboxylic acid anhydride, a vinyl cyanide compound, an acrylic amide compound, an ionic monomer and the like is listed.

[0017]

Specifically, the aromatic mono vinyl compound includes styrene,  $\alpha$ -methylstyrene and the like, the acrylic acid ester compound includes methyl acrylate, 2-ethylhexyl acrylate and the like, the methacrylic acid ester compound includes methyl methacrylate,



2-ethylhexyl methacrylate and the like, the mono- or di-carboxylic acid anhydride includes acrylic acid, methacrylic acid, maleic acid, maleic anhydride and the like, the vinyl cyanide compound includes acrylonitrile, methacrylonitrile and the like, the acrylic amide compound includes acrylamide, methacrylamide, N-methylolacrylamide, N-methylolmethacrylamide and the like, the ionic monomer compound includes sodium acrylate, sodium methacrylate, sodium styrene sulfonate and the like. Styrene, methyl acrylate, methyl methacrylate, 2-ethylhexyl acrylate and 2-ethylhexyl methacrylate are preferable.

[0018]

As the addition polymerization process, for example, a popular suspension polymerization process, micro suspension polymerization process, dispersion polymerization process, emulsion polymerization process, soap-free polymerization process, seed polymerization process and the like can be used. Particularly, an emulsion polymerization process, a dispersion polymerization process, a soap-free polymerization process and a seed polymerization process are preferable from the viewpoint of film property.

[0019]

The polymer fine particle used in the present invention

may be a crosslinked fine particle obtained by polymerizing using at least one or more of crosslinking agents in combination at polymerization of the above-mentioned monomer. The crosslinking agent used in polymerization of the polymer fine particle includes those having two or more of functional groups containing a polymerizable double bond in the molecule. Specific examples of the crosslinking agent include divinylbenzene, trimethylolpropane triacrylate, trimethylolpropane trimethacrylate, glycidyl acrylate, glycidyl methacrylate, allyl acrylate, allyl methacrylate, and the like. The crosslinked polymer fine particle is preferable because the shape is maintained to a certain degree in the respective steps of kneading, sheet forming, and stretching in the film molding of the polyolefin-based resin film.

[0020]

As the polymer fine particle used in the present invention, those having an average particle diameter of 0.5 to 15  $\mu\text{m}$  can be generally used. 0.8 to 10  $\mu\text{m}$  is preferable and 1.0 to 8.0  $\mu\text{m}$  is more preferable.

[0021]

The volatile component used in the polymer fine particle used in the present invention is not specifically limited, and for example, those usually used as a solvent can be

mentioned. Specifically, alcohols, saturated hydrocarbons, aromatic hydrocarbons, ketones, aldehydes, organic acid esters, and ethers, or a mixture thereof can be mentioned. The alcohols include methanol, ethanol, propanol, pentanol, hexanol, octanol, benzyl alcohol, ethylene glycol and the like. The saturated hydrocarbons include pentane, hexane, heptane, octane and the like. The aromatic hydrocarbons include benzene, toluene, xylene and the like. The ketones include acetone, methyl ethyl ketone, methyl isobutyl ketone and the like. The aldehydes include acetaldehyde, propionaldehyde, benzaldehyde and the like. The organic acid esters include methyl acetate, ethyl acetate, octyl acetate, methyl butyrate, methyl methacrylate, methyl benzoate, ethyl benzoate and the like. The ethers include isopropyl ether, butyl ether, amyl ether, tetrahydrofuran, anisole and the like. Water, methanol, ethanol, propanol, hexane, heptane, toluene and xylene are preferable, and water is preferable in particular.

[0022]

The amount of the volatile component contained in the polymer fine particle used in the present invention is 0.10 to 90% by weight, preferably 0.10 to 80% by weight.

When the amount of the volatile component is less than

0.10% by weight, the dispersion of the polymer fine particle happens to be insufficient. In case of exceeding 90% by weight, when a mixture of the polymer fine particle and the polyolefin-based resin is melt-extruded, the mixture becomes to be hardly fed into a screw of an extruder, and the melt-extrusion happens to be impossible because the resin extruded foams.

[0023]

The method of adjusting the concentration of the volatile component contained in the polymer fine particle used in the present invention is not specifically limited, and for example, the processes described below are mentioned.

- ① A process of leaving a solvent or a washing solution or the solvent used in polymerization of the polymer fine particle, in the polymer fine particle at a fixed concentration as the volatile component.
- ② A process of leaving a solvent or a washing solution or the solvent used in polymerization of the polymer fine particle, in the polymer fine particle at a high concentration as the volatile component, drying the volatile component to be removed and adjusting it to a fixed concentration. Examples of drying the volatile component to be removed include processes using a spray dryer, a Nauter dryer, an oven dryer and the like.

- ③ A process of leaving a solvent or a washing solution or the solvent used in polymerization of the polymer fine particle, in the polymer fine particle at a high concentration as the volatile component, mixing it with the polyolefin-based resin powder, drying the volatile component to be removed and adjusting it to a fixed concentration. Examples of mixing and drying the volatile component to be removed include processes using a Henschel mixer, a tumbler mixer, a Nauter dryer and the like.
- ④ A process of perfectly removing a solvent used in the polymerization of the polymer fine particle or a washing solution or the solvent by filtration, drying and the like, then adding the volatile component in the polymer fine particle, and adjusting it to a fixed concentration.

[0024]

The action mechanism concerning the role of the volatile component contained in the polymer fine particle used in the present invention and the dispersion to the polyolefin-based resin is not obvious. However, it is considered that the volatile component exists in the gaps of the mutual polymer fine particles or in the inside of the polymer fine particle, and is heated during being mixed with the polyolefin-based resin to be melt-kneaded,

the volatile component is volatilized and evaporated, the gaps are generated between the polymer fine particles, and the mutual polymer fine particles get loose and are dispersed in the polyolefin-based resin without coagulation.

[0025]

In the polyolefin-based resin composition of the present invention, the compounding rate of the polyolefin-based resin (component A) and the polymer fine particle (component B) containing 0.10 to 90% by weight of the volatile component is 0.05 to less than 2 parts by weight of the polymer fine particle (component B) containing 0.10 to 90% by weight of the volatile component, per 100 parts by weight of the polyolefin-based resin (component A), and preferably 0.05 to 1.5 parts by weight.

[0026]

When the compounding amount of the polymer fine particle containing 0.10 to 90% by weight of the volatile component is less than 0.05 parts by weight, the anti-blocking property of a film happens to be inadequate, and when it exceeds 2 parts by weight, it is efficient to use a master batch containing the polyolefin-based resin and the polymer fine particle anti-blocking agent.

[0027]

As the compounding process of the polyolefin-based resin

composition of the present invention, a process of homogeneously mixing the polyolefin-based resin and the polymer fine particle containing 0.10 to 90% by weight of the volatile component may be well, and example includes a process of mixing by using a ribbon blender, a Henschel mixer, a tumbler mixer or the like, etc.

[0028]

In the anti-blocking agent master batch of the present invention, known additives such as, for example, an antioxidant, a neutralizer, a lubricant, a anti-dripping agent, an antistatic agent, a nucleating agent and the like may be used in combination, within a range in which the object and effect of the present invention are not damaged. The compounding of these additives can be appropriately carried out when the respective components of the anti-blocking agent master batch are compounded and mixed.

[0029]

The anti-blocking agent master batch of the present invention can be also pelletized using a known process, for example, an extruder after compounding the respective components or after compounding the respective components and additives. In this case, the established temperature of an extruder is usually 180 to 280°C, and preferably 200 to 250°C.

[0030]

The polyolefin-based resin composition of the present invention is suitably used for production of a film. The production process of a film is not specifically limited, and known processes are used. For example, a process of melt-kneading the polyolefin-based resin composition and melt-extruding it in a sheet form, then cooling, and successively stretching to at least uniaxial direction while heating, to obtain a film, and the like are mentioned.

[0031]

The thickness of the film obtained by using the anti-blocking agent master batch of the present invention is not specifically limited, and usually 1 to 200  $\mu\text{m}$ , preferably 5 to 100  $\mu\text{m}$ , and further preferably 8 to 50  $\mu\text{m}$ .

[0032]

The present invention is further illustrated in detail below according to Examples and Comparative Examples, but the present invention is not specifically limited by Examples below. Further, the detailed descriptions of the present invention and the measured values of the respective items in Examples were measured according to the methods described below.

[0033]



1. Measurement of the amount of a volatile component contained in a polymer fine particle (unit: % by weight)

Using a vacuum constant-temperature dryer manufactured by YAMATO KAGAKU Co., Ltd., and reducing a pressure of the dryer to 0.1kPa, about 5 g of a sample was dried at 110°C for 1 hour, left alone to be cooled to room temperature in a desiccator after drying, and its weight was measured using an electric balance which can measure to an order of 0.01g to determine the value according to the equation below:

$$\text{Amount of volatile component (\% by weight)} = \{(\text{weight before drying} - \text{weight after drying} / \text{weight before drying})\} \times 100$$

Further, the polyolefin-based resin used in the present invention is a propylene polymer powder having an MFR of 2.3g/10min. and a CXS of 3.0% by weight, and the amount of the volatile component contained in the propylene polymer powder was 0% by weight.

[0034]

2. Film properties

(1) Haze (unit: %)

It was measured according to ASTM D-1003.

(2) Light Scattering Index (LSI) (unit: %)

It was measured by a LSI tester ( $\pm 0.4^\circ$  to  $1.2^\circ$  of transmitted light scatter is received) manufactured

by TOYO-SEIKI Co., Ltd. LSI value was made as a measure of see-through feeling.

(3) Anti-blocking property (unit: MPa or kg/12cm<sup>2</sup>):

Using films of 120mm × 30mm, the films are mutually piled up, and condition adjustment was carried out at 60°C for 3 hours under a load of 500g/40mm × 30mm. Then, the laminate was left alone for 30 minutes or more under an atmosphere at 23°C and a humidity of 50%, and condition adjustment was carried out. Then, tensile test was carried out at a speed of 200mm/min. using a shear tensile tester, and the strength required for peeling a film was measured. Measurement was carried out 4 times per one sample, and the average value was calculated to make the value of anti-blocking property of the film.

[0035]

(4) Number of white spot: (unit: pieces/25cm<sup>2</sup>)

The numbers of white spots having a size of about 0.2mm to 1mm which are in an arbitrary region of 5cm × 5cm of a film were determined by visual inspection. The operation was repeated twice to determine the mean value.

[0036]

Example 1

(a) Synthesis of polymer fine particle

Into a pressure glass vessel equipped with a stirrer and a reflux cooler, 380 parts by weight of methanol, 20 parts by weight of deionized water, 34 parts

by weight of styrene, 60 parts by weight of 2-ethylhexyl acrylate, 11 parts by weight of divinylbenzene, 2.5 parts by weight of hydroxypropyl cellulose and 2 parts by weight of tert-butylperoxy-2-ethylhexanoate were charged, the mixture was homogeneously dissolved, then the vessel was closed, and the mixture was polymerized at 90°C for 10 hours. Then, after a mixture of 200 parts by weight of methanol, 48 parts by weight of styrene, 4 parts by weight of 55% divinylbenzene and 1 part by weight of 2,2'-azobis(2,4-dimethylvaleronitrile) was added thereto at 60°C over 20 minutes, the mixture was further polymerized at 60°C for 4 hours, and an organic solvent slurry of a polymer fine particle was obtained. When the particle diameter of the fine particle by partially sampling from the organic solvent slurry was measured, the average particle diameter was 1.2  $\mu$ m.

[0037]

Successively, pressured steam was blown in the slurry, the mixture of methanol and water evaporated was recovered with a condenser. When the temperature of polymerization solution reached at 99°C, the blow of steam was completed to obtain an aqueous slurry of polymer fine particle. Further, the aqueous slurry obtained was separated by filtration under vacuum using a No.1 qualitative filter paper to obtain a polymer fine particle wet cake having

a volatile component amount of 48% by weight.

[0038]

(b) Adjustment of amount of volatile component contained in polymer fine particle

About 500g of the polymer fine particle having a volatile component amount of 72% by weight which was obtained in the fore-mentioned (a) was weighed, and this was charged in an accurate thermostatic chamber (DF61 type manufactured by YAMATO KAGAKU Co., Ltd.) and dried at 120°C for 5 hours. The amount of the volatile component contained in the polymer fine particle obtained was 0.14% by weight.

[0039]

(c) Pelletization of polyolefin-based resin composition

Per 100 parts by weight of the fore-mentioned propylene polymer powder (MFR = 2.3g/10min.) being the component A, 0.3 part by weight of the polymer fine particle containing 0.14% by weight of the volatile component being the component B, 0.1 part by weight of calcium stearate as a neutralizing agent, 0.2 part by weight of BHT (2,6-di-tert-butyl-4-methylphenol) as an antioxidant, and 0.2 part by weight of Irganox 1010 (manufactured by CHIBA Specialty Chemicals Co., Ltd.) were mixed with a Henschel mixer, and then the mixture was granulated at

220°C using an extruder to be pelletized. The compounding amounts of the polyolefin-based resin and the polymer fine particle in the pellet were shown in Table 1.

[0040]

(d) Preparation of stretched film

The polyolefin-based resin composition pellet prepared in the fore-mentioned (c) was melt-extruded at a resin temperature of 260°C and abruptly cooled by a cooling-roll at 60°C to obtain a sheet having a thickness of 0.8mm. After preliminary heating, the sheet was stretched 5-fold to a vertical direction at a stretching temperature of 145°C by a roll peripheral speed difference of a vertical stretcher, and further stretched 8-fold to a horizontal direction at a stretching temperature of 157°C by a tenter type stretcher. Successively, the sheet was treated at 165°C by heating to obtain a film having a thickness of 20  $\mu$ m, and then a single-sided corona treatment was carried out. The physical properties of the film were shown in Table 2.

[0041]

Example 2

(b) Adjustment of amount of volatile component contained in polymer fine particle

About 500g of the polymer fine particle having a volatile component amount of 72% by weight described in Example

1 (a) was weighed, and this was charged in an accurate thermostatic chamber (DF61 type manufactured by YAMATO KAGAKU Co., Ltd.) and dried at 110°C for 7 hours. The amount of the volatile component contained in the polymer fine particle obtained was 1.8% by weight.

[0042]

(c) Pelletization of polyolefin-based resin composition

Pelletization was carried out in a similar method as in Example 1 (c). The compounding amounts of the polyolefin-based resin and the polymer fine particle in the pellet were shown in Table 1.

[0043]

(d) Preparation of stretched film

A film was prepared in a similar method as in Example 1 (d). The physical properties of a film were shown in Table 2.

[0044]

Example 3

(b) Adjustment of amount of volatile component contained in polymer fine particle

About 500g of the polymer fine particle having a volatile component amount of 72% by weight described in Example 1 (a) was weighed, and this was charged in an accurate thermostatic chamber (DF61 type manufactured by YAMATO KAGAKU Co., Ltd.) and dried at 100°C for 3.5 hours. The

amount of the volatile component contained in the polymer fine particle obtained was 8% by weight.

[0045]

(c) Pelletization of polyolefin-based resin composition

Pelletization was carried out in a similar method as in Example 1 (c). The compounding amounts of the polyolefin-based resin and the polymer fine particle in the pellet were shown in Table 1.

[0046]

(d) Preparation of stretched film

A film was prepared in a similar method as in Example 1 (d). The physical properties of a film were shown in Table 2.

[0047]

Example 4

(b) Adjustment of amount of volatile component contained in polymer fine particle

The polymer fine particle having a volatile component amount of 72% by weight described in Example 1 (a) was used as it was.

[0048]

(c) Pelletization of polyolefin-based resin composition

Pelletization was carried out in a similar method as in Example 1 (c) except that per 100 parts by weight of the propylene polymer powder (MFR = 2.3g/10min.) being

the component A, 1.1 parts by weight of the polymer fine particle containing 72% by weight of the volatile component being the component B was used. The compounding amounts of the polyolefin-based resin and the polymer fine particle in the pellet were shown in Table 1.

[0049]

(d) Preparation of stretched film

A film was prepared in a similar method as in Example 1 (d). The physical properties of a film were shown in Table 2.

[0050]

Comparative Example 1

(a) Synthesis of polymer fine particle

The polymer fine particle was synthesized in like manner as in Example 1. Successively, pressured steam was blown in like manner as in Example 1, and the mixture of methanol and water evaporated was recovered with a condenser. When the temperature of polymerization solution reached at 99°C, the blow of steam was completed to obtain an aqueous slurry of polymer fine particle. Further, the aqueous slurry obtained was separated by filtration under vacuum using a No.1 qualitative filter paper to obtain a polymer fine particle wet cake having a volatile component amount of 45% by weight.

[0051]



(b) Adjustment of amount of volatile component contained in polymer fine particle

The polymer fine particle having a volatile component amount of 45% by weight which was obtained in the fore-mentioned (a) was charged in a Nauter dryer, a jacket temperature was adjusted to 134°C by steam, the pressure of inside was reduced to 667Pa (about 5 Torr), and drying was carried out while homogeneously stirring. When the temperature of the sample of inside reached at 120°C, the drying was stopped. The amount of the volatile component contained in the polymer fine particle obtained was 0.08% by weight.

[0052]

(c) Pelletization of polyolefin-based resin composition

Pelletization was carried out in the same manner as in Example 1(1). The compounding amounts of the polyolefin-based resin and the polymer fine particle in the pellet were shown in Table 1.

[0053]

(d) Preparation of stretched film

A film was prepared in the same manner as in Example 1(d).

The physical properties of the film were shown in Table 2.

[0054]

## Comparative Example 2

(b) Adjustment of amount of volatile component contained in polymer fine particle

Per 100 parts by weight of the polymer fine particle having a volatile component amount of 72% by weight described in Example 1 (a), 1302 parts by weight of parts by weight of water was added. The amount of the volatile component in the polymer fine particle obtained was 98% by weight.

[0055]

(c) Pelletization of polyolefin-based resin composition

When pelletization was carried out in the same manner as in Example 1 (c), a mixture of the polyolefin-based resin powder and the polymer fine particle becomes in a wet condition because of the volatile component, and a bite trouble in the cylinder of an extruder occurred. Further, the resin was foamed at the die part of the extruder, a strand was cut, the condition of the resin became unstable, and a pellet was not obtained. The compounding amounts of the polyolefin-based resin and the polymer fine particle were shown in Table 1. A film forming could not be carried out because the pellet was not obtained.

[0056]

As grasped from Tables 1 and 2, Examples 1 to 4 had

little facula points and gave a film having good appearance. To the contrary, Comparative Example 1 not satisfying the volatile component amount contained in the polymer fine particle which is a requirement of the present invention had many occurrences of white spots and gave a film having bad appearance. Pelletization and a film forming could not be carried out in case of Comparative Example 2. Further, Examples 1 to 4 had also no problem in transparency (Haze), see-through feeling (LSI) and anti-blocking property.

[0057]

[Effect of the invention]

The polyolefin-based resin composition of the present invention has a good dispersion of a polymer fine particles as an anti-blocking agent in a polyolefin-based resin, and a film made of the composition can be suitably used in broad fields such as food packaging, textile packaging and the like, because of excellent physical properties of the film.

[0058]

[Table 1]

Compounding amounts of the polyolefin-based resin and the polymer fine particles in polyolefin-based resin pellet

	Compounding amount of polyolefin-b ased resin	Amount of volatile component contained in polymer fine particle	Compounding amount of polymer fine particle containing volatile component
	Parts by weight	% by weight	Parts by weight
Example 1	100	0.14	0.3
Example 2	100	1.8	0.3
Example 3	100	8	0.3
Example 4	100	72	1.1
Comparative Example 1	100	0.08	0.3
Comparative Example 2	100	98	15

[Table 2] Physical properties of film

	Amount of polymer fine particle added	Haze	LSI	Anti-bloc king property	Numbers of white spot (size: 0.2 to 1mm)
	% by weight			MPa (kg/12cm <sup>2</sup> )	Pieces/ 25cm <sup>2</sup>
Example 1	0.3	3.1	2.3	0.71(0.6)	8
Example 2	0.3	3.0	2.4	0.71(0.6)	6
Example 3	0.3	3.0	2.3	0.59(0.5)	8
Example 3	0.3	2.4	2.7	0.71(0.6)	6
Comparative Example 1	0.3	3.3	2.6	0.71(0.6)	80

[Document Name] ABSTRACT

[Abstract]

[Subject]

To provide a polyolefin-based resin composition excellent in balance between film appearance and handling property, and a polyolefin-based resin film made of the composition.

[Solution Means]

A polyolefin-based composition characterized by comprising 100 parts by weight of a polyolefin-based resin and 0.05 parts or more and less than 2 parts by weight of a polymer fine particle anti-blocking agent containing 0.10 to 20% by weight of a volatile component.

[Selective Drawing] None